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ABSTRACT

This report is a guide for colleges of further education and training agencies in Great Britain on implementing computer literacy components of further education and training programs. The report gives findings and recommendations for the role and implementation of computer literacy based on a 2-year curriculum research project funded by the Further Education Unit centered at Gloucestershire College of Arts and Technology. While the primary aim of the project was to develop and evaluate curricula, hardware, software, and other resources for computer literacy in vocational preparation programs, the material described is suitable for teaching computer literacy to the uninitiated throughout the entire age range covered by further and adult education. This volume is intended primarily for providers of computer literacy such as college principals, vice principals, and heads of departments. It contains three chapters that provide an overview of computer literacy in the context of educational and training programs; give content, resource, and staff development recommendations; and provide strategies for assessment. A glossary of vocational education and other education and training terms appropriate to computer literacy is included in this volume. (KC)

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FURTHER EDUCATION UNIT

A Staff Development Publication

Computer literacy

Part I – A manager's guide

Jo Lloyd, James Taylor and **Chris West**
Gloucestershire College of Arts and Technology

With contributions from
Cambridge College of Further Education and
Southgate Technical College

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Dear Sir/Madam

COMPUTER LITERACY: PART I - A MANAGER'S GUIDE

I enclose herewith one of the two volumes associated with a project on Computer Literacy, carried out on our behalf by the Gloucestershire College of Arts and Technology (GlosCAT).

This volume is primarily aimed at those who are responsible for the provision of Computer Literacy. (A Part II provides detailed guidance and support material for teachers.) The attached report contains an outline definition, relates this to existing curricula, gives guidance with respect to hardware, and describes the resources, skills and support that appear to be necessary for the effective provision of Computer Literacy. The considerable extent to which the FEU has been able to agree with this advice is described in the Preface.

We hope that the report will be accepted as an important document. A main theme is that Computer Literacy is a basic skill which all teachers should be capable of teaching. The project team proved that, provided adequate support was given, this was not only a desirable but also a practical aim. This document, and its companion volume attempt to provide some of that support. The information given can be regarded as complementary to MSC material supporting its work-based YTS schemes. We hope however, that the FE sector will acknowledge its wider potential by including Computer Literacy in all its curricula, making it available to adults and young people alike.

Yours faithfully

Jack Mansell.

JACK MANSELL
Chief Officer

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c) to carry out studies in further education and to support investigations of and experimentation in, and the development of further education curricula and to contribute to and assist in the evaluation of initiatives in further education;

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PREFACE

i. This is an important document in an obviously important field. The ability, or lack of it, in using a microcomputer will, for the next two decades at least, identify our age group and/or our talent for keeping up to date. This applies corporately as well as to individuals, and the credibility of the further education sector will in no small way depend on the speed with which colleges and their staff come to terms with IT, of which Computer Literacy is a major part.

ii. This report comprises two volumes aimed at assisting the FE system to understand the concept of Computer Literacy and to make it an essential part of the FE curricular provision. In a previous report on skills*, the FEU has suggested that all FE teachers should be teachers of basic skills. Both the MSC and the FEU have defined Computer Literacy as a basic skill; the implication for all teachers, their managers and advisers, is therefore clear.

iii. Part I of the report is aimed at the providers of Computer Literacy courses and Part II is aimed at the teachers. Both volumes define Computer Literacy in terms that we should all understand; Part II additionally defines it in terms of educational aims and objectives, and provides in a modular form support material backing up that definition.

iv. As with Basic Skills, the FEU realises that we are in a situation where much of the terminology of education and training is, rightly, being radically re-defined. If better and wider education/training opportunities are to be provided for more people, then we need to critically appraise the extent to which our existing terminology restricts opportunity. With a new area of knowledge and expertise such as that presented by IT and Computer Literacy, we have to be careful not to perpetuate constraints and inequality of learning opportunities by adopting restrictive definitions and inappropriate stereotypes of ability.

v. The definitions of Computer Literacy used in this report therefore are supported by the FEU because they do not imply restriction of access. Indeed the material in Part II has been trial-tested with students representing a wide range of (conventional) ability and age. In adopting these definitions we are confident that we are associating ourselves with a type of curricular provision that should be made available to everyone. Quite obviously, as with all skills, some learners will prove more adept than others; but the connotation of computer literacy as an educational opportunity that should be available to all, is one which we firmly support. The experience of the colleges who helped to test the material generally confirms that Computer Literacy can be regarded as an everyday skill available to everyone. Like all skills, it decays if it is not taught and learned thoroughly, and if it is not practised and updated from time to time. The introduction of Computer Literacy into schools therefore, does not absolve the FE system from responsibility for the further development of this skill for young people and adults.

vi. There is a high degree of compatibility between the definition of Computer Literacy that is supported in this report and that adopted by the MSC for its YTS programmes. Those discrepancies that do exist are relatively minor and

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* Basic Skills FEU, November 1982

relate largely to the nature of programming required. Part II in particular therefore should be useful to teachers and tutors associated with any scheme of vocational preparation, whether work or college-based. The design-base of Computer Literacy in this report rests upon a core of 28 modules, plus a selection of optional, more vocationally specific, modules. Teachers and tutors will wish to choose for themselves how they organise the learning of these modules and appropriate guidance is given in the report, but the FEU, in supporting the definition espoused in this report, hopes that all students/ trainees will have the opportunity of experiencing at least the core modules. For most students this represents some 30 hours of work - not an excessive period if one considers the potential disadvantages of being computer illiterate.

vii. Valuable information on resources and hardware is contained in both volumes of the report. The authors suggest that, for Computer Literacy courses, the BBC model B microcomputer may be the 'best buy', but suitable alternatives are given. It is appreciated that many colleges are not starting from scratch, neither are their needs necessarily solely related to Computer Literacy, so it is hoped that this advice will be accepted as useful guidance for those who wish to note it, rather than as a prescription from the FEU.

viii. Much the same applies to the resources required to support Computer Literacy programmes. There is no lack of experience to show that too many excellent educational schemes fail because they are not adequately resourced and supported. Too few machines could deter otherwise willing teachers from commitment to the task of providing computer literacy for all their students. Inadequate technicial support and software can similarly frustrate both teachers and learners who are willing to have a go. As indicated in paragraph ii above, the FEU believes that all teachers should be able to teach Computer Literacy. The quid pro quo is a reasonable level of support; and again we hope that the advice given in this report with respect to resources, staffing and training - based as it is on experience - will be accepted as positive guidance rather than an FEU prescription.

ix. An attempt is made in Part I to relate Computer Literacy to many of the existing curricula in this area. This section will inevitably date as the major Examining Boards generate more schemes. The problem for colleges however, is to ensure now that time is available to provide this essential skill for all students. This requires a college policy, commitment and probably a re-allocation of time between subjects. Local rather than national decisions are necessary. All this report can do is provide a framework for those decisions.

x. In both volumes, but particularly in Part II, guidance is given to teachers with respect to the content, teaching skills and attitudes that have proved to be useful in getting to grips with this subject which must be new to most of us. Part II contains a significant amount of teacher support material, including guidance with respect to assessment and software, which has implications for the training of teachers and support staff. The authors maintain that "the levels of computer expertise needed by staff can be provided in a relatively short time". This is good news; and it is no accident that we have designated both volumes as Staff Development publications.

xi. We can only reiterate that, by describing Computer Literacy as a basic skill, we mean that all have the right to acquire this type of literacy. The responsibility of all teachers to contribute to the acquisition of this skill,

must be for many one more extension of their professionalism. The alternative is to define Computer Literacy as a restricted skill, taught only by 'expert' teachers, to a selected group of students. For a new subject, so universally applicable, this would be nothing short of an economic and educational disaster.

xii. Finally, the FEU Board of Management would wish to place on record its appreciation of the colleges that contributed to the report. In particular our thanks are due to the Gloucestershire College of Arts and Technology who so willingly supported Chris West and his team in what was obviously a demanding project. It is to be hoped that the reception of this report is an adequate testimonial to their effort.

JACK MANSELL

Introduction

This report is written in the form of a guide to Colleges of FE and Training Agencies on implementing Computer Literacy components of FE and training schemes. The report gives findings and recommendations for the role and implementation of Computer Literacy based on a two year curriculum research project funded by the FEU and centred at Gloucestershire College of Arts and Technology. The project team has worked in conjunction with a group of three FEU Experimental Colleges who have contributed to the development of material, and a further group of 10 colleges who have piloted materials. The primary aim of the project has been to develop and evaluate curricula, hardware, software and other resources for Computer Literacy in vocational preparation schemes in colleges and elsewhere, but the material is also suitable for teaching Computer Literacy to the uninitiated throughout the entire age range covered by Further and Adult Education, and many training courses.

The report is in two parts.

Part I is intended primarily for <u>providers</u> of Computer Literacy, ie for those engaged in the management function (College Principals, Vice Principals, Heads of Departments, Managers of YTS schemes, Directors of TVEI schemes). This part contains an overview of Computer Literacy in the context of education and training schemes and gives content, resource and staff development recommendations, together with strategies for assessment.

Part II is intended mainly for the classroom teacher or workshop trainer and gives detailed teaching materials including teaching plans, resources, (including software), assessments and projects. It is structured in a modular form to allow teachers to build and teach courses using a variety of resources, with a minimum of difficulty.

To achieve parity of information for the two categories of user, a minimum amount of basic information appears in both parts of the report.

Computer Literacy is a dynamic area of education and training. The technology and its applicability are constantly breaking new barriers. This scheme and report have been structured to allow updating within topic areas.

During the project, a definition of Computer Literacy in terms of Aims and Objectives has been developed and iteratively refined, together with appropriate teaching schemes which have been tested on a wide range of courses, ranging from vocational preparation courses for ESN students, through mainstream vocational education, to courses for adults.

The project team is grateful to those who have participated in the evaluation process and have demonstrated the potential of the material in varying degrees of flexible interpretation and contributed their ideas to the refined scheme.

Readers of this report should be encouraged by the fact that a number of Teaching and Training establishments are already successfully using much of this material in a variety of contexts and modes.

PART I

A MANAGER'S GUIDE TO COMPUTER LITERACY

CHAPTER 1

AN OVERVIEW

Background

1.1 Two years ago when this project began, the terms Computer Literacy and Information Technology were not widely used. The Youth Opportunities Programme (Y O P) and Unified Vocational Preparation (U V P) were established as the main M S C forms of vocational preparation schemes and the inclusion of a computing element was regarded as fairly radical. In conventional F E programmes, Computing tended to form part of the supporting General Studies programme. We have now witnessed the emergence of Computer Literacy (C L) and Information Technology (I T) not only as well known terms (albeit with a multitude of different definitions) but also as core components of schemes such as \ T S.

1.2 At the same time ongoing developments have been taking place in the major curriculum bodies (i.e. City and Guilds, R S A, B E C, T E C and CNAA) with respect to the role of Computer Literacy and Information Technology throughout training and Further and Higher Education. The Microelectronics Education Programme (M E P) has made significant inroads into implementing Computing across the curriculum in schools.

1.3 The Technical and Vocational Educational Initiative provides a further focus for Computer Literacy developments. The 17+ Certificate of Pre Vocational Education is still under preparation, but it is anticipated that this scheme will contain Computer Literacy.

1.4 The Youth Task Group in its report for the development of the Youth Training Scheme ([1]M S C April 1982) recommended a guaranteed one year high quality training programme for employed and unemployed 16 and 17 year old school leavers in 1983/1984. Pilot Schemes have taken place in 1982/83. This project has sought to standardise the Computer Literacy that would be offered on these schemes. In generic terms a common core of Computer Literacy has been included as part of the common core of basic skills that is recommended for all vocational preparation schemes (F E U 1982[2])

What is Computer Literacy?

1.5 In layman's terms,* we define Computer Literacy as follows:

A computer literate student should:-

(i) Understand what computer systems are

(ii) Use computer vocabulary

(iii) Operate a microcomputer

(iv) Appreciate what a program is and why it works

(v) Be aware of applications of computing in commerce, industry and other settings

(vi) Be aware of current trends in Information Technology and its social implications.

* (In Educational/Training objective terms this definition of Computer Literacy is given in full in Part II Chapter 3)

Footnote 1. Youth Task Group Report April 1982 (M S C)
2. A Basis for Choice 2nd edition, FEU Dec. 1982.

This accords well with a recent M S C definition of Computer Literacy as

(i) A general awareness of Computer Jargon and Computer Systems

(ii) The skills to react with a computer to perform useful tasks.

What is Information Technology?

1.6 Information Technology (I T) is a term which is now widely used in public life but is often misunderstood.
It is the integration of Computer and Data communications technology to produce, store, obtain, manipulate and send information in the form of pictures, words and numbers reliably and quickly.
The distinct difference between Computer Literacy and Information Technology is that I T includes basic skills in Electronics.

More about Computer Literacy

1.7 Returning to our layman's definition of Computer Literacy, we examine it further:

1.7.1 We need to know something about how computers work and the vocabulary associated with them, before we can understand what they do or use them. Gone are the days when terms such as hardware, software, floppy disc, RAM were the province of computer professionals who mystified the rest of us.

1.7.2 Amongst our piloting colleges, a variety of micro, mini and mainframe equipment has been successfully used. The BBC microcomputer has been identified as a possible best buy for Computer Literacy courses in view of its cost effectiveness, robustness, versatility and software and hardware support. It is worth noting that not only can the

BBC microcomputer be used effectively as a relatively low cost resource for creating a computer environment for training purposes but that there are many examples of its successful use in a variety of working environments ranging from monitoring heart beats in a London Hospital to word processing in small businesses. However, our evidence is that the RML 380Z, LINK 480Z and Sinclair Spectrum are also suitable machines for Computer Literacy.

It should be stressed that the operation of a microcomputer in vocational preparation schemes should be closely tied to working situations. Motivation of trainees is vastly increased when the operation skills are learned using software which is closely related to their career interest.

1.7.3 It should be stressed that the inclusion of an appreciation of programming in our aims means a <u>minimal</u> experience, and that the implementation of this can be achieved in a variety of ways. It does not necessarily mean the writing of programs in BASIC. The rationale for including it is that to fully understand and to confidently use pre written software packages demands an appreciation of how that package has been produced, and its potential vulnerability. A demystifying of what would otherwise be a black box has proved successful and has gained almost unanimous support in our field testing and evaluation.

At the same time the recent availability of the languages PROLOG and LOGO on microcomputers means that programming can be introduced in rather more painless and interesting ways as an alternative to BASIC. (PROLOG and LOGO are languages which are based on

mathematical logic and are nearer to everyday 'human' expressions of problems whereas BASIC, although the universal language of micros, is more influenced in its structure by the hardware). The most important factor to consider is that given a proper minimal introduction to programming a student feels more in control when operating a package.

1.7.4 A wide awareness of computing applications in commerce, industry and other settings is an aim which could get lost in specific training courses geared to a particular career path. This project seeks to give a wide awareness to all trainees. Again the awareness of current trends in Information Technology and its social implications (particularly the effect on jobs) needs to be included in any Computer Literacy Programme. It is in these latter two aims that training and education cannot be divorced if students/trainees are not to lose sight of the context in which they are working.

What will Computer Literacy do for Vocational preparation students?

1.7.5 Evaluation has shown that Computer Literacy has enabled students to cope confidently with the technology when they have encountered it in its various forms at work and home, and to adopt a considered view of its social implications. It has enhanced their employment potential particularly in small businesses where the need is for the possession of a wide range (but not necessarily depth), of microcomputing and other skills. It has opened the door for vocational preparation students with identified potential in I T to pursue further F.E. qualifications and hence obtain higher quality jobs. It is heartening that it is through Computer Literacy that an otherwise hidden potential is identified.

What will Computer Literacy do for adults?

1.7.6 In evaluating these materials with adults ranging from T O P S Adult Preparation Students to M S C employees it has been found that, given appropriate intensification of the programme, adults quickly become Computer Literate, and therefore confident in relating to the Computer World at all levels.

What Computer Literacy is not

1.8 It should be noted that Computer Literacy, as defined in this report, can become confused with other educational activities involving computers. Computer Literacy should not be confused with:-

(i) Computer Aided Learning (CAL or Computer Managed Learning or Computer Based Learning)

i.e. the use of computers to aid learning of e.g. Chemistry or Language or Numeracy.

(As a spin-off, Computer Literacy facilitates C.A.L. and there are some interesting possibilities of capitalising on this in the teaching of numeracy and literacy in vocational preparation schemes).

(ii) More intensive and specialised training/education in Information Technology

Examples of this are the Information Technology Centre provision (ITECS) supported by M S C/D O I, N C C Threshold Schemes, and BEC/TEC Computing schemes at all levels.

The link here is that in becoming computer literate in vocational preparation schemes a student may show potential for further more intensive training or education by one of these routes, thus opening a path to a professional I T career.

The Common Core - Relationship with 'A Basis for Choice'

1.9 In 'A Basis for Choice'[1], clear recommendations were made, in terms of a checklist of aims and objectives, as to the experiences all vocational preparation students should have and the nature and level of performance that they could be expected to achieve. Thus the nature and content of a core curriculum was established and many F E colleges and schools have used ABC in a variety of ways to develop schemes. ABC was not intended to be a static syllabus but a dynamic check list related to current needs. In 'ABC in Action'[2] (the FEU/ CGLI report on the piloting of ABC) this point is stressed and in particular the need is reported for 'an appreciation of microtechnology' to be added to the Core of ABC. In Part II Chapter 3 of this report, specific Computer Literacy aims and objectives are suggested as additions to the ABC core, with additional material which can be used selectively.

1.10 This project strongly recommends that all students follow all of the common core as defined in Part II Chapter 3. This differs somewhat from the Y T S core concept whereby a larger number of objectives are stated, not all of which are intended to be achieved.

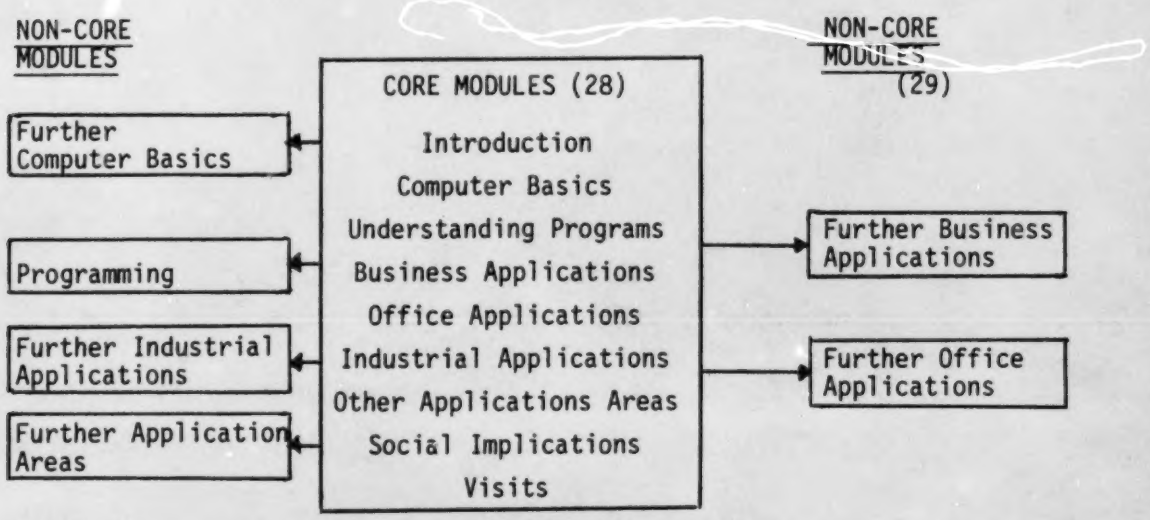
Footnote 1. A Basis for Choice. 2nd edition, FEU Dec. 1982.
2. ABC in Action FEU, September 1981.

1.11 The common core has been structured to reflect a wide range of aspects across the Computer Literacy spectrum (i.e. from Word Processing to Microelectronic Control) as distinct from developing skills and knowledge in a single area of Computer Literacy.

Beyond the Common Core

1.12 Given the needs of Further and Adult Education to specialise in specific aspects of Computer Application Areas, or to move into more specialised area of Computing, and, given the design of the Youth Training Scheme with 11 occupationally based training families (O T F's), there is a requirement for a Computer Literacy course which goes beyond the common core and provides material which can be selected for achievement of objectives in specific areas. A useful coverage of Microelectronic Applications in these areas, is given in Dean K.J. F E U 1981.[1]

1.13 The modular Computer Literacy Scheme presented in Part II of this report has a structure which is shown in the following diagram.



Footnote 1. K.J. Dean Microelectronics in F E Some personal perceptions F E U October 1981.

Computer Literacy Schemes can thus be built by adding selectively to the common core, modules from areas appropriate to the students' needs. Each module, as described in Part II, Chapter 4, can be taught in a minimum of 1 hour but supporting materials give the opportunity for extension. The modules are grouped in sections within which selectivity of resources, assessments and projects can be exercised by the class teacher. Although the BBC microcomputer is the recommended resource base, the modules have been presented as far as possible to be hardware independent.

Resources - the key issues

1.14 Resources are detailed more fully in Part I Chapter 3 and Part II Chapter 5 of this report.

It is important to recognise that the major resource provider for Computer Literacy courses is the Local Authority. There is evidence that many YTS managing agents will be turning to FE colleges to provide Computer Literacy courses. In a climate of cuts, the recommendations in this report represent minimum requirements. It is important to note that Computer Literacy resources can be used with all levels of students and that FE colleges should do their utmost to use microcomputer resources to generate income by fully utilising them for self funding courses.

A summary of resource costs is given in the check list for action on page 16

Hardware

1.15 The aims and objectives of the Computer Literacy course must be supported by sufficient and appropriate hardware. Ideally this means 1 workstation to 1 student. (A workstation comprises a keyboard, processor, monitor, disc or cassette unit and optionally a printer). Evaluation has shown that 1 workstation to 2 students is a satisfactory and potentially advantageous ratio in that students can learn from each other, thus rapidly increasing confidence. The BBC model B microcomputer has emerged as a robust, versatile and cost-effective microcomputer for Computer Literacy Teaching. The most favoured alternative microcomputers are the Sinclair Spectrum and Research Machines 380Z and Link 480Z.
It is recognised that Colleges and Training Agencies may already have set up a Computer resource base. In Part I Chapter 3 alternative resource configurations are documented with comments on their suitability.

1.16 Evaluation has reinforced the obvious advantages of disc storage over cassette storage. This is particularly important to maintaining the motivation of low ability students. Given a student class size for YTS of 15 then the cost* of the minimum requirement of 8 workstations would be:-

Cassette based	£5728
Disc based	£8168

* July 1983 prices based on 2 students to 1 workstation.

Printers (£300 extra) are necessary but it is not vital to have one per workstation. By use of a simple device, 4 microcomputers can be linked to one printer.

1.17 Consideration should be given to the advantages of ECONET, the BBC network system whereby workstations can be linked to a disc file server and printer. At the time of writing it has not been possible to evaluate this due to unavailability but the potential is obvious. [Cost £8946 for 8 station network]

1.18 Providers should also budget for supporting hardware in the form of low cost robotics, the BBC Buggy, £169, being a versatile possibility and the Bigtrak tank, £29, a good introduction to control concepts. [Part II Chapter 5]

Software

1.19 Software has been developed for this Computer Literacy scheme and is recommended, together with a selection of commercially produced educational software. There is still a paucity of good user friendly commercially available software outside the CAL or Games area. The software listings provided in this document are written and tested on the BBC micro but, with the exception of those using Graphics facilities, are transferable to other machines. A set of essential, commercially produced, software covering the areas of word processing, database and financial modelling is recommended, at a low cost of £88. (See page 31).

Audio Visual Resources

1.20 Video tapes and slides form an essential component of this Computer Literacy scheme. Facilities for using them need to be available.

Accommodation

1.21 A dedicated room for teaching Computer Literacy, with a minimum of 8 workstations (for a teaching group of 15), audio visual resources and a technician are essential. Computer Literacy modules integrate the use of microcomputer facilities, video tapes, exposition and assessment within single sessions. Transferring students to A.V. facilities during a session or bring equipment in is an undesirable barrier to motivation and an inefficient way of achieving objectives.

Staff Resources

1.22 Computer Literacy teaching staff need not be Computer Specialists (who are in short supply) but ideally should be teachers with skills in other areas to which Computer Literacy can be related. Computer Literacy is for all. The consequence of this is that Computer Literacy teachers will be required in large numbers. Evaluation has shown that, by using appropriate staff development strategies, teachers from a wide variety of backgrounds have been successful in teaching Computer Literacy. It should be noted that Computer Literacy is demanding on teaching skills in that they are stretched to the limits in motivating vocational preparation students towards technical competence and at the same time imparting an awareness of the technology. The F E system needs to give attention to rewarding appropriately those who use such skills (which are possibly less stretched on more conventional/higher level courses).

1.23 Technician support for Computer Literacy teachers is essential. Requirements and a strategy for technician development and provision are given in Chapter 3 of Part I. Teachers should not be expected

to keep the equipment in running order and maintain software libraries but should be left free to concentrate on the achievement of Computer Literacy Objectives in the classroom. This is in common with any Laboratory subject.

1.24 In setting up Computer Literacy Courses, it is easy to underestimate the lead times needed for resource purchase and staff development. Current pressures to mount these courses quickly could lead to an interim lowering of quality. It is hoped that this report will provide support to minimise the problems of implementation.

1.25 The following table is a checklist for action for Computer Literacy providers. It gives approximate costs for a facility which will accommodate up to 15 students at the recommended ratio of 2 students to 1 workstation.

A reference is given for each item in the checklist to enable providers to examine further details given in the report.

HAVE YOU?	COST	REFERENCE
a) Provided sufficient hardware	BBC Cassette based £5728 or Disc based £8168 or Econet £8946) +£600 printer	Page 27
Supporting Hardware (robotics and graphics)	£193	Page 28
and Software	Project Software Free Other essential software £88	Page 30
b) Provided a dedicated room with adequate 13 amp points		Page 31
c) Provided Audio Visual Resources (Video playback and slide projection facilities)	Normally available as central college resource.	Page 31

HAVE YOU?	COST	REFERENCE
d) Recruited and developed lively, flexible and confident teaching staff		Page 33
e) Provided and trained a technician	£3000-£6000 p.a.	Page 32
f) Selected material (core and non core) appropriately integrated with the parent course		Pt. II p.28
g) Selected an appropriate assessment strategy		Pt. II p.351
h) Provided mechanisms for visits	Transport costs	

1.26 Evaluation has clearly affirmed that the key ingredients are adequate resourcing and enthusiastic staff, firmly supported by a committed management.

CHAPTER 2

A REVIEW OF EXISTING CURRICULA

Computer Literacy/Information Technology Developments within major curriculum bodies

2.1 All major curriculum development bodies are considering or implementing Computer Literacy/Information Technology policies. The following constitutes a brief review of the current situation.

City and Guilds of London Institute (CGLI)

2.2 The main CGLI Certificate in Computer Literacy is 953 Computer Literacy, which constitutes a non-vocational award to stimulate and assist people in becoming adept at using microcomputers and in recognising their initial success. To gain this assignment-based certificate, applicants must write a simple but useful working program and have begun to solve problems unaided. This certificate defines Computer Literacy as the ability to design and implement a program, usually in BASIC. This differs from the broader definition of Computer Literacy in this report and falls outside the recommended core, but it provides a useful certificate for those who go beyond the core into the programming modules.
GCLI also provides established vocational schemes

746 Basic Certificate in Computer Programming,

747 Computer Programming and Information Processing, and

788 Data Processing for Computers Users,

and are currently piloting the following new vocational schemes:
IT System Supervision,
The Practical Application of Microcomputers,
Software and Hardware Evaluation,
Program Design and Techniques.

These vocational awards should be regarded as possible further courses for students who have been introduced to Computer Literacy through the material in this report. In addition to this it may be appropriate to present Computer Literacy modules for certification by the City and Guilds Skills Testing Service.

Royal Society of Arts (R S A)

2.3 R S A's current single subject syllabuses include

Computer Operations Certificate,
Computers in Data Processing Stages I and II.

The Computer Operations Certificate is specifically orientated towards operation of a mainframe computer.

The second examination is aimed at students in the commercial, secretarial or liberal studies areas and is thus orientated towards commercial situations. Students have to demonstrate their skills in operating computers in addition to passing the examination.

Business Education Council (B E C)

2.4 The BEC Ordinary Certificate/Diploma in Computer Studies is a suitable 1st qualification for a student who has shown potential in Computer Literacy. It allows for local variation within its structure and is primarily concerned with a practical grounding in Computer skills together with application and contextual knowledge in commercial situations.

Technician Education Council (T E C)

2.5 T E C has already included the F E U (Interim) Computer Literacy Aims in its Curriculum Guide for Technician Studies, and sees Computer Literacy as playing a part in T E C programmes at all levels. In addition to this, T E C has developed Information Technology Units which span the spectrum of I T and include a significant amount of Electronics. These units are suitable for study by a student who has shown potential on Computer Literacy courses.

B/TEC Higher Awards

2.6 There exist many established B/TEC Higher Diplomas in Computer Studies and Information Technology, together with more recent developments in Industrial Data Processing. The ordinary and higher awards programme of B/TEC thus presents a useful path of progression to students who come into I T via Computer Literacy in Voc. Prep.

Council for National Academic Awards (C N A A)

2.7 At degree level, the C N A A has made a policy statement on the role of I T in all degree courses (Policy Statement 20/27) to which course providers are asked to respond. The implication of this policy statement is that all degree courses will have an I T content (for which some of the material in this report may be suitable).

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Manpower Service Commission - Y T S developments

2.8 The Y.T.S. Contents and Standards Committee has developed Computer Literacy and Information Technology aims and objectives as part of the overall development of aims and objectives for the core area of Y T S The significant features of these aims and objectives are as follows:-

(i) They give a wide coverage of Computer Literacy and Information Technology and are consequently expected to be achieved selectively.

(ii) They are totally training based, concentrating on using the technology.

(iii) In the design of Y T S the Computer Literacy core aims and objectives are expected to be achieved through the Occupational Training Families with assignments carried out at the work placement.

The scheme presented in this report is consistent with the emerging Computer Literacy aims and objectives of Y T S and has already been adopted by several Managing Agencies in successful submissions to M.S.C. Area Boards. Working papers on Y T S core aims and objectives are normally available from M S C Area Offices.

2.9 Manpower Services Commission - Y T S developments for Information Technology Centres

The M S C commissioned a research team at the Ergonomics Unit, University College, London to develop a core curriculum for Information Technology Centres. A report should shortly be available. Given that core curricula for Y T S schemes as referenced in 2.8 will

follow the approval and establishment of many schemes there will need to be a period of monitoring and adjustment before all schemes will meet core guidelines.

2.10 Manpower Services Commission - Review of TOPS Computer Training

The M S C has recently reviewed its TOPS Computer Training programme. This is fully documented in a recently published report.[1] The recommendations in this report are concerned with an updating of TOPS training to reflect the current state and applications of Computing but the report also recommends that M S C should continue to develop Computer training as a second skill in a range of specified courses. The next obvious step would be Computer Literacy for all TOPS trainees. The report also recommends that M S C Area Office Staff should have the opportunity to undertake basic training in computer fundamentals to assist them in their duties related to T O P S and Y T S. The materials in this report have already been scucessfully used in providing 3 one day Computer Literacy Training Courses for the M S C Area Office Staff of Glos and Wilts. (Part II Chapter 7 page 425).

Footnote 1. M S C July 1983. Report of Review Group on TOPS Computing Training Chairman H. Sharp.

CHAPTER 3

IMPLEMENTATION

3.1 This chapter is concerned with the implementation of Computer Literacy courses. It considers detailed resource requirements including staffing & staff development needs. Assessment is considered in view of its importance in monitoring the progress of students and the success of courses in achieving their aims.

RESOURCES

3.2 It is hoped that the information given below will help providers:-

(a) To quantify their resource needs

(b) To qualify their resource needs

with particular reference to their existing resource base, if any. The Modular teaching/training plan is structured in a flexible manner to allow teachers either to implement it using the recommended resource configuration based upon the BBC microcomputer or to interpret it flexibly using available or enhanced resources.

3.3 A provider may have an existing mini computer facility or microcomputer cluster. Given that Computer Literacy embodies the use of pre-written packages, word processing, and some programming, graphics and micro-electronic control, it is unlikely that a provider's existing facilities will be able to be upgraded to cover the full range of core Computer Literacy activities. Resource providers may therefore consider alternative strategies for enhancing their existing facilities, if appropriate, with BBC equipment or for starting from scratch with the recommended BBC resource base. The software provided in the scheme is written for the BBC microcomputer, and those programs without a graphic content are transferable with minor

changes to any equipment supporting the programming language BASIC.

3.4 Another strategy adopted by certain colleges, who have already heavily invested in other hardware, has been to take the ideas in the modules and produce their own software, which has not proved difficult to do. Resource providers should therefore read this section, with the knowledge of their own resources and of the needs of the recommended scheme.

Hardware Resources *

3.5 Single Workstation - The BBC Microcomputer

	CASSETTE BASED	DISC BASED
BBC Model B	399	469
Colour Monitor	287	287
Cassette recorder/player	30	
100K Single Disc Drive		265
Microline Printer	300	300
Total	1016	1321

Economies in purchases of disc units and printers can be made by having single disc units and printers networked to microcomputers using the ECONET system. There has not yet been an opportunity to evaluate this system due to unavailability.

* July 1983 prices.

Prices are as follows:

8 Station ECONET System £8946

incudes:

Terminator and power supply

Clock and power supply

Cable, sockets and plug connectors

2 discs

Teletext receiver

Printer

800K Dual Disc Drive (80 track)

10 Stations £1131

15 Stations £10617

Further information is available from

Acorn Computers Ltd

Fulbourn Road

Cherry Hinton

Cambridge

CB1 4JN

Tel: (0223) 245200

Additional Hardware items

3.6 For details of these, eg, the BBC Buggy and Bigtrak Tank, see Part II Chapter 5.

Alternative Hardware Resources

3.7 The following, in ascending order of cost, are viable alternatives to the BBC microcomputer. Most of them have been used by piloting colleges. Providers are warned to pay careful attention to manufacturers' cost specifications in that costs as quoted are sometimes inclusive of monitors, printer and disc storage and sometimes exclusive.

Alternative Hardware Resources

The following, given in four cost ranges, are viable alternatives to the BBC microcomputer for Computer Literacy teaching.

MICROS

COST RANGE	EQUIPMENT	COMMENTS
LOW £100-150 per work-station	Sinclair Spectrum £120	Less robust multi function keyboard than BBC. ZXNET and Microdrive allow networking. Interfacing facilities. A good buy for a highly controlled environment.
	Acorn Electron	Lower cost version of BBC without interface and printer port.
LOW MEDIUM £500-1500 per work-station	Research Machines RML 480Z £585+ cassette/disc and monitor	Networking facilities
	RML 380Z	Well proven and robust. Many upgrading possibilities.
	TANDY	Networking facilities.
HIGH MEDIUM £1500-£3000 per work-station	COMMODORE PET MCCOMBO NASCOM APPLE II/LISA ZENITH Z89/Z100 DEC RAINBOW	Networking facilities
MINIS HIGHER	PDP 1139/1140 SYSTIME	Approx. Costs Processor £10,000 Disc Drives £30,000 each Terminals £1,300 each

Optimising F E Resources

3.8 In providing Computer Literacy facilities, management may wish to make use of the equipment for professional computer training, in which case it is advisable to invest in systems which are CP/M (Control Program Microcomputer) based. This allows access to CP/M standard ranges of microcomputer software

e.g. WORDSTAR

SUPERCALC

DBASE2

The BBCmicrocomputer can be upgraded to a CP/M compatible machine by use of the TORCH Z80 disc pack.

Further information obtainable from

TORCH COMPUTERS,
Abberley House,
Great Shelford,
Cambridge
CB2 5LQ

RML 380Z are CP/M compatible
Zenith machines are CP/M compatible

(CP/M is a standard microcomputer operating system i.e. a program which controls the computer)

Software Resources

3.9 Software resources fall into two categories:

(i) software provided with the project materials, which includes

(a) user-friendly application software, and

(b) assessment software;

(computerised check tests)

(ii) recommended commercially available educational applications software, covering the areas of
Database, Word Processing and Financial Modelling.

The resource provider needs to determine whether equipment is provided which will run software in category (i), in which case this is provided at zero cost in this document.
The resource provider needs to allocate a sum of approximately £88 for software in category (ii).

Costs will vary here according to equipment and software used. For further details, see Part II, Chapter 5.

A.V.A. Resources

3.10 It is recommended that Video Play back and slide projection facilities are provided for Computer Literacy teaching in a dedicated or on demand fashion. The key factor here is that these facilities should be made available in the room where Computer Literacy is taught. For details of resource materials, see Part II, Chapter 5.

Accommodation

3.11 It is essential that Computer Literacy is taught in a dedicated room which should be large enough for a class set of 8 micros*, writing facilities, storage facilities and use of A.V. facilities. The dedicated room should have a ring main with isolating switch. (Room layouts are given in Part II Chapter 5). The justification for this is that class sets of microcomputers are not really portable and there is firm evidence of damage, due to movement, being a major problem. The integrated nature of the teaching plans require students to be watching,

* Based on a YTS group size 15.

writing, using the microcomputer and using A.V.A. resources in any one session. A dedicated room is an essential pre-requisite of the achievement of core Computer Literacy objectives.

STAFF RESOURCES

Technician Staff

3.12 The provision of a technician to support a dedicated Computer Literacy Room is seen as an essential requirement. The duties of the technician are listed as follows:-

1st Level Maintenance of Equipment,
taking equipment to local maintenance centres (or arranging for maintenance),
maintenance of a Computer Literacy Software library,
commissioning new equipment,
helping staff and students with operational problems,
maintaining the security of hardware and software,
maintaining a stock of supporting material,
maintaining a stock of hand outs, and,
if necessary, writing and documenting programs to staff specifications.

In F E colleges the difficulty of obtaining funding for technician support in non traditional areas is as well known as is the possible overmanning of traditional areas now in decline. It is firmly recommended (i) that positive attention be given to redesignating technician support within colleges with consideration to the needs of Computer Literacy. (ii) That the use of external funds for C.L. technician support be considered. A strategy which has functioned well in several colleges during evaluation has been to use H.N.D. Computer Studies Sandwich

Year Students on Industrial Placement as temporary technicians. There are advantages on both sides here in that the college/Training Agency gains a person who is sufficiently young to relate well to students while having one year's appropriate training and generally good motivation, at a reasonably low cost (£3,000-£4,000); while the H.N.D. student gains a wide range of valuable experience which in some cases develops his interpersonal skills to a greater extent than would a programming placement in industry.*

If Technicians need to be trained or re-trained, the following strategy is recommended:

(i) a Core Computer Literacy Course as in this document,

(ii) an Acorn BBC micrcomputer maintenance course.

Teaching Staff

3.13 The successful tutor will obviously need a certain level of knowledge of computers and computing together with the necessary practical skills of computer operating and programming. In addition, a range of teaching skills are needed. The common problem is that those staff experienced in teaching computing are not experienced in teaching students found on this type of course and that staff experienced with this type of student have insufficient knowledge of computing. Different staff development strategies are needed in each case. Firstly, we consider the teaching skills and attitudes that are critical when dealing with students on pre-vocational courses, and the level of subject knowledge and skill required.

* Glos CAT and some polytechnics are willing to supply students for interviews for such placements.

Teaching Skills

3.14 There are several frameworks for the discussion of teaching skills. The following one appears appropriate for this study.

Organisation Skills. The structured framework provided by our computer literacy teaching programme could overcome any deficiency here, and provide for effective presentation of materials.

Directing Skills - Communicating to the students the nature of the task and what is expected of them. This again is helped by the prepared materials, but skill in this area is closely linked to motivating and interpersonal skills.

Explaining Skills. These are always needed and some staff, often with a high level of academic ability, find great difficulty (or perhaps reluctance) in simplifying complex concepts in order to make them understandable to students with little previous knowledge. In this context the language used (not necessarily computer jargon but an inappropriate language register) can alienate the students. The use of jargon can be motivational - as the student learns to understand, it engenders a sense of achievement. How much to use and when, cannot be generalised.

Questioning Skills. Here vocabulary plays a part again, but questions must be carefully framed and presented if effective feedback is to be obtained. The answers themselves must be 'accepted' in such a way as to maintain interest and motivation.

Motivating Skills. The tutor must communicate enthusiasm. Student interest is often initially high but motivation to participate and put themselves to the test is often low. The situation can be further complicated by peer group perception of the role of the student and

the norms of behaviour associated with it. This can result in a very limited level of participation being 'allowed'. Lack of confidence and fear of failure can also make the motivating skills of the teacher a factor critical to success.

Interpersonal Skills. As mentioned previously, the course needs to be student centred and the teacher must relate to the individual as well as the group. The interpersonal skills which have been noted as important are: accepting and dealing appropriately with deviance, accepting as legitimate some student norms and values, and establishing individual relationships with the students.

3.15 Teacher Attitudes

It is obvious from the above that certain teacher attitudes are more likely to precondition success than others. Tutors must have a positive commitment to the course and to the students involved and must communicate this. They need a positive attitude towards the achievement of high standards by students but this should be directed towards practical (rather than academic) achievement. Tutors also need an open and flexible attitude towards their own teaching style in order to adapt where necessary. It is likely that it is in this area, that it will be most difficult to effect change. The level of computing knowledge and skill needed by staff can be gauged from the course materials themselves. Staff involved in teaching this scheme have varied considerably, from those currently teaching up to degree level in computing to the recently self taught. It is a conclusion of this study that the levels of computing expertise needed by staff can be provided in a relatively short time. (See Part II Chapter 7).

The critical factor would appear to be teachers' attitudes, rather than their computing knowledge or skill. They must have a strongly favourable attitude towards students and a concern for their individual success and be positively motivated towards involvement in the course. The significant teaching skills needed are those of motivating the students, together with the related interpersonal skills. However, it is likely that the teacher must reach a threshold level of competence in all skill areas (3.14) before success can be achieved.

STAFF DEVELOPMENT

3.16 The considerations above on the attributes of successful computer literacy tutors lead naturally to a discussion of Staff Development needs. These can be divided into 3 areas.

(i) the preparation and development of staff for teaching on computer literacy courses - initial development.

(ii) the development of staff currently teaching 'computer literacy' within a variety of courses - continuing development.

(iii) the development of staff concerned with other elements of vocational preparation provision - integrative development.

INITIAL STAFF DEVELOPMENT

3.17 The 'initial development' needs of staff are likely to be in developing the necessary level of computing expertise, an appreciation and acceptance of the course philosophy and methodology, and the confidence to embark enthusiastically on teaching this course.

Three training events can be provided to meet the differing needs of staff coming to teach in this area.

a) Computer Literacy Training - for staff with little or no experience in this area. This could be provided by a training course of 20 hours duration based upon the student teaching materials in this scheme, thus not only providing the basic level of computer expertise needed but also introducing the teaching materials and methods to be used.

b) Introduction to Materials and Methods - for staff with the necessary level of computer literacy but with no experience of teaching on this particular course. A one day (6 hour) course would provide for this. This course could also be available for staff teaching on the parent course, to promote integration. (See Part II Chap 7).

c) Induction to the Parent Course - for all staff teaching computer literacy as an element of a parent course.
Many colleges are now providing induction schemes for staff who are going to teach on YTS courses. Each parent course would need to make its own arrangements.

In addition the staff development support provided needs to include at least:-

a) a team of teachers to provide support and an opportunity for group problem solving and the development of new materials;

b) the opportunity to observe teaching of this subject across a variety of vocational preparation courses;

c) resource-based materials for teaching and learning, to maintain teacher confidence in at least the initial stages;

d) access to technician support for setting up and running the computers and for any 'crisis' which may occur.

CONTINUING STAFF DEVELOPMENT

3.18 Here the primary need is to provide staff with the opportunity and relevant experiences to allow them to reflect upon their own teaching approach, to evaluate its success, and to examine and devise new approaches and methods which could be appropriate. Obviously curriculum development and staff development must be firmly linked with each other and to course appraisal. Established staff must be able to engage in course development together with staff new to this area. Meetings should be regular, structured and purposeful, and officially scheduled. The use of such staff in providing the training events at the initial stage can be an important element in the development of experienced staff as it encourages them to reflect upon and make explicit the rationale behind their working practices.

For staff recently trained in computer literacy the support and technical assistance outlined earlier is essential. In addition these staff can benefit from access to further training in computing. In this connection the BBC Referral Service* course has been found to be of use in allowing individuals to guide their own development once they have a basic knowledge. Courses leading to recognised qualifications are also often attractive to staff.

* BBC Referral Service - a tutorial system provided by many colleges linked to the BBC Computer Programmes and using the BBC Microcomputer.

INTEGRATIVE STAFF DEVELOPMENT

3.19 Computer Literacy in the context of this study is always an element in some parent course. This produces a need to integrate it with that parent course and, with that need, two staff development problems arise. Firstly, staff involved in other area of the parent course need a sufficient appreciation of the computer literacy component to stimulate them to take advantage of what goes on there and use it in their own teaching. (This is not to be confused with the general staff development need for computer literacy - see FEU Project RP56 Staff Development on Microcomputers). Secondly computer literacy staff need an appreciation of the philosophy and methodology of the parent course.

A basic staff development course in Computer Literacy using the materials developed in the project is described in Part II Chapter 7. This can be used both as a basic training for staff preparing to teach computer literacy and an integrative training for "core skills" staff. The materials and techniques presented in Part II were highly successful when used with an adult group.

CASE STUDIES

3.20 There follows a brief description of two staff and the training they received in preparation for teaching computer literacy on pre-vocational schemes.

Mrs. A. is an experienced teacher with a strong commitment to vocational preparation teaching, which has developed from working on YOP & Adult Training Schemes. She had no knowledge of computing and even a slight mistrust of modern technology but an appreciation of the role it has to play in today's society.

Training provided:-

(i) a 3 day (15 hour) course provided for any College staff interested, on operating a microcomputer, simple programming and the use of a range of software;

(ii) the BBC referral service - a 20 hour tutorial service spread over an eight week period.

Mrs. A. taught close to the computer facilities which were being used for computer literacy classes and was therefore able to use them in her spare time and also to discuss matters of concern with the computer literacy teacher and observe him at work.

Mrs. A. and Mr. B. were paired to teach the computer literacy module on a Work Introduction Course (12 weeks x 2hrs/week). They were provided with the interim report of this study and very effective technician support. The students who completed the course achieved the objectives set. Mrs. A. will now be teaching computer literacy for a major part of her timetable.

It must be remembered that Mrs. A. has taken every opportunity to improve her computing skills and has devoted much of her own time to her development.

Mr. X. is a computer technician with very little previous teaching experience. His basic qualification is a T O P S Computer Operators' Certificate. However he has a strong personality and an evident concern for young people. His level of computer competence was not a problem and no training here was needed.

As an introduction to the strategies developed in this project, he was provided with the course materials (interim report) and met with other staff teaching computer literacy. Most importantly he was put in the staff room with the 'voc prep' staff. The main

development took place here by introducing him to the ethos of the course and its teaching methods and providing the opportunity to discuss common problems.

Training provided:

(i) an induction course (16 hours) into YTS, including teaching and assessment methods,

(ii) C GLI 730 FETC course - one year completed.

Mr. X. will now be co-ordinating YTS computer literacy provision as well as teaching on other core skill areas.

3.21 These case studies are intended to illustrate that staff development can be achieved and that a formal training input is a necessary but not a sufficient condition. The membership of a team with the ability to discuss problems and test ideas is the vital ingredient. The overwhelming majority of staff recruited to teach in this area are, and indeed will be in future, not highly qualified computer professionals but staff with an interest in computing, and with varying levels of computing skill who are motivated for a variety of reasons to take up this role. This study has shown that such staff can, given the support and training outlined, perform effectively and help students achieve computer literacy.

<u>The role of the Accredited Centre and RCBs in disseminating curriculum materials and training staff</u>

3.22 Staff development needs are discussed at some length above. The Accredited Centres could now accept the challenge to meet some of these needs. It is obviously too soon to say how successful they will be.

However it is to be hoped that the challenge will be accepted by YTS STaff Training Co-ordinators and that they will use some of their resources in this area. Regional Curriculum Bases could provide a means for the dissemination of curriculum materials in this as in other areas. The maintenance project (RP 168) will allow for the updating of the materials presented in Part II as well as providing a limited software distribution service.

ASSESSMENT

3.23 It is important that those persons responsible for organising, implementing and monitoring courses containing a 'computer literacy' component, take account of assessment at an early stage in their planning. They must ensure that time is available for effective assessments to be made and that the procedures adopted are congruent with the aims of the parent course.

The system of assessment described in Part II, Chapter 4, of this report has the following purposes:-

(i) to provide feedback on progress to the student to motivate and inform further learning.

(ii) to provide feedback to the tutor to improve teaching.

(iii) to provide predictive evidence of the student's suitability for employment within a particular occupational family and/or for further training.

3.24 The primary responsibility is to students: to improve their learning and to enable them to take decisions concerning future vocational aspirations and training needs. Once this premise is accepted then the following factors must be borne in mind:-

- the students' previous educational experience, their attitude towards and their perception of assessment. It is likely that many have been familiar with the use of assessment as a control process and as a means by which they are to be segregated from educational and/or vocational opportunities. The consequent mistrust of assessment and unwillingness to participate in it, must be taken account of.
- the learning aims of the parent course, of which computer literacy is an element, and the structural relationships between the course and further training and employment opportunities.
- the ethos of the parent course. The starting point for much vocational preparation was 'A Basis for Choice', developing through a variety of YOP courses to the YTS, CGLI 365, B/TEC and other pre vocational schemes. All these have their own ethos, their own embedded aims and objectives. These may have shown a shift in emphasis over time, but still place value upon the individual's development. If this position is accepted then the assessment procedure as well as the learning experiences must accommodate a wide range of starting and finishing points as well as great variety in the pace of learning.

3.25 The learning aims of this course cover the three areas of knowing, understanding and doing.[1] Assessment in all three is needed, the concentration being upon what can be done, on assessing and recording the students' capabilities and not their limitations, with 4 specific

Footnote 1. See 'How Do I Learn?' FEU December 1981.

aims in view:

- There is a need to motivate individual students and provide them with rapid feedback on their performance and development. This necessitates the use of informal and unobtrusive methods that may be student administered and recorded. Indeed the involvement of the student in the assessment process is vital in the achievement of some of the embedded aims of the course. In this context the use of negotiated assessment procedures is clearly seen as essential, which is not to deny the place for tutor implemented formal assessment in providing a reference point for both self and negotiated assessments.
- There is also a need for process as well as product assessment. It is appropriate to consider the way in which students handle equipment/problems/activities, both in order to gauge the effectiveness of the teaching as well as to assess the achievements of process objectives. Much of the formal assessment is likely to be concerned with convergent abilities but given that value is placed upon divergent production - creative solutions to problems, then this must not be ignored.
- As to the norm- versus criterion referencing debate, it should be stated that progress is to be measured from the individual's starting point and that an attempt is made to provide criteria of achievement even if this is only at the can/cannot do level.
- The assessment process is continuous and related to the achievement of stated learning objectives. The achievement of these objectives is a sequential process and can be

recorded at the appropriate stage in the course, but there is a need for a terminal assessment review in order to produce a summative statement of achievement.

THE ASSESSMENT PROCEDURE

3.26 This can be seen in the assessment guidelines to be found in Part II, of the report - Chapter 4, Section Z (p 351).

The basic strategy is that there is an initial assessment of experience, ability and motivation. (Module Z1), (page 359), that the student maintains a progress log, in which the results of individual and group activities/projects/tests are recorded, that there is at least one mid course review (Module Z2) (page 360) and a final assessment procedure (Module Z3) (page 361) at the end of the course. The final assessment review will take place between student and tutor and will use the student progress log as the basis for the completion of the Statement of Student Achievement (page 363). This does not prevent the use of tutor administered tests of performance and indeed the guidelines contain examples of such tests. In particular the 'FEUTEST' package (page 392) offers course designers a considerable degree of freedom in constructing test material to assess the achievement of the 'memory' objectives, with a minimum of effort.

3.27 Chapter 6 of Part II (page 415) of this report contains a brief statement on student achievements and it would be salutary to record its main conclusion here. It was a finding of this study that conventional descriptions of student ability and potential have little relevance in the field of Computer Literacy. Some students who have

experienced learning difficulties in other areas have shown that they have the ability to gain both the knowledge and the skills that this course sets out to impart.

3.28 This chapter has given an outline of the operational needs of Computer Literacy courses. Part II expands on these needs and give materials for translating them into practise.

3.29 The provision of computer literacy programmes not only equips students with a life-skill which is fast becoming as essential as other forms of literacy, but also provides an introduction for many of them to a successful learning experience.

APPENDIX A

GLOSSARY OF VOCATIONAL PREPARATION AND OTHER EDUCATION AND TRAINING TERMS APPROPRIATE TO COMPUTER LITERACY

B E C	Business Educational Council
B/TEC	The recently merged Business and Technician Education Council
C and G or C G L I	City and Guilds of London Institute
C P V E	Certificate for Pre-Vocational Education (17+)
C S I T	Computer Services Industry Training Council
I T E C	Information Technology Centre M S C /D O I supported Y T S centres.
M A P	Microprocessor Application Project
M E P	Microelectronics Education Programme
N C C	National Computing Centre
N T I	New Training Initiative
R S A	Royal Society of Arts
T V E I	Technical and Vocational Education Initiative (M S C 14-18 scheme)
T E C	Technician Education Council
T O P S	Training Opportunities Programme
U V P	Unified Vocational Preparation
W E E P	Work Experience on Employers Premises
W I C	Work Introduction Course
Y O P	Youth Opportunities Programme
Y T S	Youth Training Scheme

APPENDIX B

LIST OF COLLEGES ASSOCIATED WITH THE PROJECT

(i) F.E.U. EXPERIMENTAL COLLEGES

The following three colleges have been grant aided by the F.E.U. to investigate Computer Appreciation. They have tested our existing materials and have contributed to the development of new modules:-

Cambridge College of F.E.

Southgate Technical College

Worthing College of Technology

(ii) PILOTING COLLEGES

The following colleges have piloted materials:

Mid Glos Technical College, Stroud

Abingdon College of F.E.

North Warwickshire College of Technology and Art, Nuneaton

Frome College, Frome, Somerset

Oldham College of Technology

Yeovil College, Somerset

South Warwickshire College of Further Education, Stratford-on-Avon

Uxbridge Technical College

Trowbridge Technical College, Wiltshire

Oxford College of F.E. Oxford

Bournside School, Cheltenham

APPENDIX C

STEERING COMMITTEE

P. Davey (Chairman)	Head of Dept. of Mathematics and Computer Studies, G C A T
P. Boon	Factory Manager, Embisco Limited, Walls Group
B. Cattle	Head of Department of Educational Technology, Southgate Technical College
Mrs. S. Edgington	Senior Tutor, Prevocational Education G C A T (Principal Lecturer Oldham College of Technology from September 1982)
G. Ewan	Executive Computer Services Industry Training Council
C. Grewcock	Head of School of Vocational Preparation G C A T
N. Harrington	Manpower Services Commission, Bristol
Dr. A.F. Jeans	Vice Principal, G C A T
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Mrs. J. Lloyd	Project Team G C A T
J. Mansell	Chief Officer F E U
R. Margetts	Regional Director M E P
D. Mason	Director of Y T S , G C A T
Mrs. B. Pratley	Development Officer F.E.U. Vice Principal Abingdon College of F.E. from September 1982
P. Shuker	Principal, Leeds College of Buidling
Ms. J. Shirley	Development Officer F E U
J. Taylor	Project Team G C A T (Staff Development Officer)
P. Waite	County Adviser, Gloucestershire
C. West	Project Co-ordinator, G C A T

FEU Publications

Computer literacy is one of a number of FEU publications intended to inform teachers and others and to stimulate professional discussion about matters of concern to the FE service.

Other FEU publications in the microelectronics field include:

Computer Aided Design in FE: some suggestions on the inclusion of CAD topics in Mechanical Engineering courses. November 1982. (Order No. 9826)

This document, by Peter Ingham of the City of Birmingham Polytechnic, is intended to give guidance to those concerned with the introduction of Computer Aided Design (CAD) into technical curricula. Whilst specially related to mechanical engineering, it should also prove useful to those in other disciplines. The author considers as inevitable the widespread adoption of CAD by British Industry. Further education will, therefore, have an obvious role to play in CAD development, if it is to remain a significant contributor to technological updating.

Towards the electronic office: an overview of the curricular implications of new technology for office and business education and training. September 1983. (Order No. 163)

Commissioned by the FEU from Christine Disney, Computer Consultant, this publication reviews the curriculum implications of new office technology as they have appeared recently. The early sections of the document describe a growing awareness and use of information technology by industry and commerce. The latter sections describe the ways in which the training and education systems are reacting to a rapidly changing situation.

Computer aided profiling: a case study at the North Warwickshire College of Technology and Art, September 1983. (Order No. 164)

A description of how North Warwickshire College approached the computerisation of student profiles for a full-time vocational preparation course. The report outlines the background against which the computerisation idea evolved, the design of the profile, its computerisation, the means by which the idea has begun to be further disseminated throughout the college, the implementation of the profile on one course and the lessons which have been learned as a result. Appendix 1 of the document presents the computer specification.

Copies of these documents (which are free of charge) are obtainable, while stocks last from the Publication Despatch Centre, Department of Education and Science, Honeypot Lane, Canons Park, Stanmore, Middlesex HA7 1AZ.

A complete list of FEU publications is also available from the above address.

The FEU has a number of Research projects (RPs) ongoing in the microelectronic field:

RP 59 Review of Microelectronics in FE.
RP 65 Robotics — a curriculum module for technicians.
RP 80 Computer assisted numeracy profiling.
RP 86 A computerised profiling scheme of numeracy, communications and media studies.
RP 87 Computer-aided profile assessment and curriculum design across a college of FE.
RP 94 Computer appreciation for all full-time and part-time day students.
RP 104 Introduction of computer studies and "hands-on" experience into lower level courses.
RP 106 Word processing curriculum review.
RP 108 Microcomputer use for FE students.
RP 110 A computer based curricular provision for rural communities.
RP 118 Computer literacy for UK shipping management.
RP 119 The implications on FE curricular of the introduction of the robot.
RP 120 Identification of training requirements in computer-aided engineering for smaller firms.
RP 130 Information technology in FE.
RP 151 Computer aided design and manufacture.

Details of these Projects are available from FEU, Room 7/48, Elizabeth House, York Road, London SE1 7PH.